**Problem Posing Template for Individual Activity**

(Copy this template and share your ideas for incorporating problem posing in one of your courses. Share your work in the Collections.)

**Module Overview**: one sentence about the activity

A bioinformatics lab in an upper-level course going from gene sequences to gene/species tree reconciliation.

**Setting**:

Target course (title, majors/non-majors, level [introductory/upper-division], size of class [# of students], lab or lecture

Genomics: lab portion, Junior/senior undergraduates,

Learning Outcomes for the activity-

Goals:

Experience interacting with linux, RaXML, a piece of less-developed research software tool for reconciling gene and species trees

See differences between established and less established software

Develop comfort troubleshooting when using command line

Understand the different forms of genetic data that can be used to develop different types of trees

Outcomes:

Extract sequence data from preprepaired database

Generate a gene tree from sequence data.

Generate a reconciliation between gene tree and provided taxa tree

Answer formative questions like, “why did we use this command, what did it do? Through out

Answer questions meant to help interpret the reconciliation

How does data acumen align with this learning outcome? Place an “X” in the column next to the skills practiced in this activity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Quantitative Pillars** |  | **Data Life Cycle** |  | **Social/Pedagogical Concepts** |  |
| Mathematical |  | XData import |  | Communication |  |
| XComputational |  | Management |  | Equity, Diversity, Inclusivity |  |
| XStatistical thinking |  | Curation |  | Universal Design for Learning |  |
| XReproducibility |  | XAnalysis |  | Ethics |  |
|  |  | XSharing/ Reporting |  |  |  |

**Activity/Module**:

Describe the activity-

Course type (e.g. Lecture, lab)- Lab

Pedagogy (e.g. Case, research project, final report, lab activity)- Lab activity

Describe the data and the tools used to interact with the data- Genetic sequences. Linux, RaxML, RANGER-DTL, TreeView

Describe where problem posing will be used and how you as the instructor will use problem posing to shape the activity-

* What is the Question Focus?
* How is the Question Focus introduced?

The problem posing will be used at the end. Essentially, “Now you have these reconciled predictions of gene transfers and duplications and where they happened. Now what? What do do we want to know about these predictions

Describe the student products- Answers to questions throughout the written exercise. Active participation in group discussion, formulation of a future research question as part of a small group. The question should be supported or answerable, at least in part, based on the evidence provided by the tree and reconciliation generated in lab.

**Assessment**:

How will this learning outcome be assessed? See products

Will students practice this skill again? In what setting (same topic, new topic)? Unknown, I was not teaching the whole course

**Extra information**:

What will students need to know before completing this activity? Basic genetics and some preliminary understanding of phylogeny. What are horrizontal gene transfer and duplication?.